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ABSTRACT

The functional writing model is a method by which students learn to devise and organize a written argument. Salient features of functional writing include the organizing idea (a component that logically unifies a paragraph or sequence of paragraphs), the reader's frame of reference, forecasting (prediction of the sequence by which the organizing idea will be developed), and continuous forecasting (revelation of the direction or line of reasoning in an argument). Since the functional writing model is highly adaptable and enables technical/professional writers to compose faster and better, it can be used to good effect as a teaching technique by writing teachers who collaborate with technical skills teachers in such disciplines as architecture, psychology, history, business, and engineering. Student writing models that demonstrate the functional writing strategy are provided. (RL)

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APPLICATIONS OF THE FUNCTIONAL WRITING MODEL IN TECHNICAL AND PROFESSIONAL WRITING

At Carnegie-Mellon University, the technical and professional schools are meeting the growing demand for better student writing by engaging individuals to teach writing within the context of the professional school itself. It's not that the English Department evades responsibility for teaching technical writing -- indeed, it has an excellent program -- but that it lacks the resources to fill all of the professional colleges' needs. The faculty of the Communication Skills Center, where I teach, has therefore become increasingly involved in the teaching of writing in collaboration with faculty and courses within the technical and professional schools. Our problem has been to develop expertise in and methods and materials for writing in a variety of technical and professional disciplines. A solution we have used effectively is Functional Writing.

Functional Writing is a writing model, a method of teaching the devising and organizing of an argument, originated by A..D. Van Nostrand of Brown University. The model was inspired partly by his experience as a consultant in industry. Functional Writing is taught at many colleges as the Freshman composition course, and further uses are being made in many places. The model seems to have possible applicability to several kinds of writing situations.

We are using Functional Writing to teach technical and professional writing by presenting to students selected, key concepts of the model. Although the course is designed to be sequential and cumulative, we find

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that upperclassmen and graduate students often do not need instruction in each step in the course. We choose the particular concepts we present in any situation, or at least emphasize certain concepts, on the basis of the individual problems we find in writing samples collected from students in that discipline, and on the basis of the general demands of the discipline. We design exercises that use these Functional Writing concepts and strategies and that contain specific professional content.

Over the past two to three years, I have applied the essential concepts and strategies of Functional Writing in Architecture, Psychology, Urban and Public Affairs, History, Pre-Law, Business, and Engineering. On the whole, I've found Functional Writing to be highly adaptable for the range of the kinds of thinking and writing that are done in carrying out the world's work: for reporting, explaining, and making recommendations based on technical data; for writing business letters and memos; and for management communications where the purpose is to explain, analyze, and recommend actions, where the data used may or may not be technical, but where the basic concern is with behavioral and social concepts and issues. The concepts contained in the Functional Writing model work for all these different areas and purposes because the same core of rhetorical and thinking competencies underlies all of them: analyzing, inferencing, supporting generalizations, organizing information and ideas. Also, the same fundamental demands exist for all technical and professional writing: thorough consideration of the writer's purpose and the readers' response -- how they will use the writing; absolute clarity; self-evident logic and organization; sufficient data or evidence to prove the generalizations; and concise, precise, mechanically correct prose.

In serving at least a substantial portion of these needs, Functional Writing stands solidly on principles known from contemporary research in

learning theory and language behavior. The model assumes that writing is a process and stresses that writers need to be aware of the steps in this process in order to control it. It looks at writing as a process of making and stating relationships, a process one goes through, ideally, by making reasoned choices about what relationship to say, or develop, next. It looks at the writing process as a means of learning about one's subject. And it looks at the product, the piece of writing itself, in terms of the reader's needs to understand and use that product. Accommodating the reader's needs, it teaches, helps the writer compose more easily, quickly, and effectively.

Some of the specific concepts of Functional Writing that I regularly teach for use in professional writing are the following: (1) the organizing idea -- the logically unifying component of a paragraph or a sequence of paragraphs; (2) the reader's frame of reference, defined as his or her perspective, or world view; (3) forecasting -- predicting for the reader one's organizing idea and the sequence in which it will be developed; and (4) continuous forecasting -- revealing the direction or line of reasoning in an argument.

The first strategy, the organizing idea, is fundamental, simple, in a sense obvious (good writers surely have always done it), and perhaps the most frequently violated element in technical writing. An organizing idea is an assertion that relates and incorporates the information in any paragraph or sequence of paragraphs. Writers create an organizing idea by making an inference, by generalizing about a set of information. The reason this concept is so often violated in technical writing, I think, is that technical writers tend to assume their readers know without being told what inference is implied in the information. But without an organizing idea

the assertions in a written statement can remain logically unrelated and the particular significance the writer attaches to the information can remain a mystery to the reader; as a result, the reader may have difficulty putting facts into a context.

Using Functional Writing, then, writers begin the process by listing a set of information they have gained, usually from some on-the-job investigation, and by then asserting an organizing idea -- what they want to say about the information. The Functional Writing method for teaching writers to make organizing ideas is initially to present a ready-made set of information, such as the following one about electric cars, and to ask the writers to compose organizing ideas.

Subject: Electric cars

Set of information:
-- limited performance capability
-- battery power
-- twenty years to develop
-- pollution
-- range of forty miles

Organizing ideas:
1. The energy shortage that will surely be with us for some time to come may be somewhat alleviated by the reintroduction of the electric car.
2. The "cast-off" concept of electric cars is receiving new attention in these times of energy shortage.
3. More spending is expected for electric car development.
4. Despite the efforts of the engineering and scientific communities for twenty years, it is doubtful that an effective electric car can be built to equal or surpass the gasoline driven automobile.

One can see from these organizing ideas written by several engineers -- and the writers quickly and dramatically see -- that no single or particular organizing idea is inherent in the information, and that therefore when a writer presents data without an organizing idea, the reader has to guess what significance or context the writer has in mind.

The concept of frame of reference teaches writers to analyze their audience, the most important factor in the professional communication situation. They analyze both for the purpose of making the communication clear to that audience and for the purpose of accomplishing their intention -- whether that intention is for the reader to understand something, to hold a particular opinion about something, or to act in a certain way. (Actually, the question of the writer's purpose is not stressed in Functional Writing as much as I think necessary for technical and professional writing, but it's there and must be pointed out.)

After introducing the idea that different readers have different frames of reference (and different ones from the writer), Functional Writing shows writers how to describe their audience(s) according to objective characteristics such as the reader's level of knowledge and expertise or the political situations within an organization, and -- even more difficult -- subjective characteristics such as personal goals and values, likely attitudes, assumptions, and feelings. The following sample, written by a middle management person in a major industrial firm, contains a fairly complete description of the readers.

> Readers: Management and staff in Corporate Planning and Comptroller group.
> 1) Audience level varies from the para-professional to the advanced professional.
> 2) The professional levels in the two groups are not equivalent.
> 3) Reader characteristics vary considerably based primarily upon how each reader can use the information.
> 4) Writer's discipline is management science. Readers' knowledge of this discipline varies from ignorance to familiarity. A need exists to bridge gap.
> 5) Need to establish the value of the math model to readers. The document will present its meaning and value, i.e., how it will help them do a better job.

Next, the model shows writers how to address or accommodate the reader's frame of reference by establishing a common ground. The example below,

written by a graduate student in Urban and Public Affairs, shows two statements that contain similar organizing ideas but that present the information and organizing idea differently for different readers:

> Organizing idea:
> I am seeking support for a project that will investigate the causes of the financial plight of minority-owned businesses and will recommend ways to stimulate and expand these businesses.
>
> Reader A: A minority owner of a thriving business in a minority community.
>
> Statement to Reader A:
> The more thriving stores there are in your community, the more people will shop there. It would be good business practice, therefore, to invest time and money in projects to strengthen struggling but potentially successful businesses in your community.
>
> Reader B: A city counselor
>
> Statement to Reader B:
> Although an initial outlay of tax dollars to struggling minority-owned businesses may seem risky, stimulating and expanding these businesses could result in the creation of jobs, a decrease in welfare payments, and an increase in tax revenues. Therefore, it is beneficial to the city to support projects that help minority-owned businesses.

One sees how each reader can relate to, or at least not feel threatened by, such a tailor-made statement. I often ask writers, in addition, to practice using the readers' frames of reference by writing a short statement of definition or explanation for two different readers at two different levels of knowledge, as in this definition of the term "autoxidation":

1. Paragraph addressed to a technician who is a high school graduate but has little previous experience in a chemical laboratory:

> Oxidation means the combination of oxygen (or air) with a substance. For example, when coal is burnt in the air to carbon dioxide, it is called the oxidation of coal. Autoxidation is the term used to describe an oxidation in a chain process. For example, substance A is oxidized to B, which in turn is oxidized to C and D.

2. Paragraph addressed to a research chemist:

> Autoxidation is a degenerative oxidation process. It usually proceeds by a radical process. Radicals combine with oxygen molecules to form numerous radicals. Recombination of radicals results in process termination.

The idea of the need for beginning a written statement by forecasting what is to come follows logically from these discussions of the organizing idea and the reader's frame of reference. At this point, everybody understands that the reader of a piece of professional writing is a busy person who wants to know very quickly, at the beginning, what the writing is about, how the aspects of the subject will be developed, and what conclusion the writer has arrived at. In technical writing, in fact, the forecast may be all the reader reads; he or she may need to know only the generalities or conclusions, and may skip the particular details altogether. Furthermore, the idea of forecasting is broadly useful as a pure, almost abstract concept. Forecasting in any situation allows an audience to settle more or less comfortably into a communication with a sense of knowing where it's going; forecasting enables an audience to put all that follows into a context.

Specifically, what Functional Writing teaches as a forecast is simply an introduction. Functional Writing teaches one how to build this introduction by going through the pre-writing activities of grouping information into categories (which will become paragraphs) and sequencing these categories, or paragraphs, in some logical order. The example below, containing information from an architectural study, shows such an organizational activity. The categories following the list of information in this example are numbered to show the sequence in which they will be used.

Subject: The American Porch

Set of information:
--Most common use of porch in English colonies during the 17th century was as an internal vestibule space.
--Dutch builders in New Jersey and New York considered their porch an outside living space.

--The large central hall in Southern plantation houses originated as an outdoor living space.
--The climate, surroundings, and style of living in the South created a house type that was unique in the U.S., and the porch was an integral element of that type.
--An example of the Greek revival is the Ohio T-shaped plan, which had a porch with Greek columns.
--In the late 19th century, houses with extensive front porches were built all over the U.S., to maximize the pleasures of outdoor summer life and set the stage for neighborly interaction.
--In the late 19th century, porches became an obsession.
--Bungalows, popular at the beginning of the 20th century, were a response to climatic conditions.
--Use of the porch was at its height during the early years of the 20th century, then began to decline.
--The porch declined for the following reasons: (1) use of telephone for gossip, (2) automobile noise, (3) TV for entertainment, and (4) air conditioning.

Possible organizing idea:
Porches in America were a response to the climate, the style of living, and some foreign influence.

Possible categories and sequence of information:
3 Porches were used as inside or outside space.
1 Porch designs were a response to climate.
4 Porches were built for relaxation: the view, chatting with neighbors, etc.
5 Building and use of porches has declined recently.
2 There were foreign influences in the design of porches.

The forecast itself, then, contains a statement of the organizing idea and describes the supporting categories, in the sequence they will be developed. Such a forecast, the basic stuff of exposition, works well for professional writing in the social sciences and in some technical writing.

But also, the concept is clearly applicable to the complex process of forecasting in technical reports, which usually includes levels of forecasting -- often called, all together, a problem-purpose statement. In the following example of a problem-purpose statement that forecasts, the engineer has clearly delineated the problem, the technical purpose and task (parts of the report, in sequence), and the rhetorical purpose (organizing idea) of the report:

The biodisk waste water treating system is currently being employed effectively to treat waste waters containing high levels of contaminants such as raw municipal sewage and raw industrial waste waters. This study was initiated to determine if this type of treating system would be effective in treating low contaminant waste waters such as the waste water entering the ____ treating facility. } PROBLEM

The purpose of this study was to examine the performance of a biodisk treating system by testing the influent and effluent from the system and comparing the results with the more conventional waste water system employed at ____. } TECHNICAL PURPOSE AND TASK

The test results show that the biodisk unit was more effective in removing the contaminants than the present system, and should be considered as a technique to upgrade the _____system, to insure compliance as NPDES limits become more restrictive. } RHETORICAL PURPOSE: TO REPORT RESULTS

An understanding of the essential meaning of forecasting helps one understand the concept of continuous forecasting. Forecasting is the technique of initially revealing to readers the way the writer intends to develop the subject; it gives readers a sense of direction. Continuous forecasting means that the writer continues to show the readers the direction, where the line of reasoning is going, by showing how each new assertion relates to what has come before it. This focus on the structure, the logic of the relationships among assertions, helps make that logic clear to both the writer and the readers; revealing the pattern of development of the subject helps both the writer and reader anticipate what will come next.

What continuous forecasting teaches, really, is coherence. The functional Writing model says that an argument is coherent to the degree the logic of the sequence of assertions is self-evident. The reader must be able to see how each assertion, or each section, follows from the preceding ones and leads to those following, just as he or she can see, for example, the coherence -- the relationships, the sequential logic -- in the sequence 2, 4, 6, 8, 10. Continuous forecasting, then -- making and revealing relationships -- assures sequential logic. In the following paragraph, the successive connections are highlighted to show continuous forecasting at work.

Biodisk treating units are one type of treatment of waste water being used to upgrade or replace other forms of treatment.

These units use partially submerged inert disks that are slowly rotated in the waste water being biologically treated.

The disks provide a support for the water treating biota.

The alternating wet and dry cycles provide the biota with the food (organic contaminants) and air (oxygen) required for biochemical treatment.

The concept and use of biodisks in water treatment is not new but the availability of improved inert media and the low energy required have sparked renewed interest in this treatment.

Originally the disks were constructed from plywood but the newer disks are constructed from thin polyethylene or polypropylene sheets that are lighter, more inert and provide more surface area in a smaller space.

The slow rotation of the disks requires much less horse-power for equivalent treatment than the mixing and oxygen transfer required for activated sludge and aerated lagoon treatments.

In discussing these four concepts of Functional Writing, I do not mean to imply either that they constitute the only significant parts of the model, or that these concepts finally serve all needs in technical and professional writing. They are, rather, examples of the concepts and strategies I have found adaptable in the teaching of technical writing; and they are available and well packaged. Their specific strength lies in their focus on the reader, and on clarity, coherence, and organization -- what's needed in professional writing. But also, there are several general advantages to being able to use such selected, key concepts, especially in the Communication Skills Center's mode of operating as consultant in professional or content courses, where we're asked to build a writing component into a course, or we're asked to give a brief course in writing, or even a single workshop. For one thing, we need a set of strategies we can present quickly and fairly simply. This is because, although it makes eminent good sense to teach writing in a professional context (as opposed to English Department writing courses), where certainly the students are motivated to learn, in all these situations the professional content takes precedence, and the amount of time anybody will devote to writing is limited. Furthermore, we need flexible strategies through which we can stress particular areas for particular professional audiences -- evidence and hypothesis in social science, for example, or forecasting in the technical report. And we need concepts that give us a specific vocabulary for discussing writing and clear criteria for evaluating writing, and that can finally help writers learn to evaluate their own writing. Functional Writing concepts, in their ability to fill these needs, can become the stuff of collaboration between teachers of technical skills and teachers of writing. Presenting either all or selected parts of the Functional Writing model, to the extent a situation allows and demands, can help technical and professional writers write faster and better; it gives them strategies they can use.